Research Article

The choice of approach in total hip arthroplasty, does it really matters?

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ABSTRACT

Background: Various surgical approaches have been described for total hip arthroplasty with their own advantages and disadvantages. In the study it would like to know whether there is significant difference exists between the most widely used posterior and lateral approaches.

Methods: Study was a randomized prospective study in 108 hips. Out of 108 hips 52 were operated by posterior approach and the remaining 56 by lateral approach. The choice of approach was determined by random numbers. In the study functional outcome was compared with the Harris hip score, rate of complications and the effect of approach on the placement of acetabular cup with relation to its inclination and version in arthroplasty of the hip.

Results: Similar results in both approaches were found; there were no statistically significant difference in the outcome.

Conclusions: To conclude, the approach did not significantly affect the outcome in total hip replacement with respect to functional outcome or rates of complication. And it neither influences the acetabular cup placement. Proper operative technique seems to be more important than the choice of approach in total hip replacement. Studies with a bigger sample size need to be done to further throw light on the role of approach on cup placement.

Keywords: Total hip arthroplasty, Surgical approach, Functional outcome

INTRODUCTION

Charnley, with his concept of low friction arthroplasty revolutionized total hip arthroplasty in 1962 with his first surgery and published his results in 19721.

Total hip replacement has seen tremendous progress since then. Many approaches to the hip for replacement surgery are described. The two most common ones that have endured the test of time are the posterior and lateral approaches.

Hence, need to assess the functional outcome of these two approaches and compare them especially with reference to the rate of complications was felt, if any, as they usually decide which approach will embrace in there practice.

Kelmanovich D, et al in their article briefed on the various surgical approaches to the hip. In their observation the most common approach used is the posterior due to it being technically simpler, but the high rates of posterior dislocation of the hip are a cause for concern.²

Roberts et al compared the anterolateral and posterolateral approaches in 175 patients and observed that the posterolateral group had significantly less perioperative morbidity as defined by lesser blood loss and shorter surgery time, albeit having an increased
incidence of posterior dislocation of the hip and acetabular loosening.\(^5\) Robinson et al first suggested that the external rotators should be sutured to the greater trochanter to reduce the rate of dislocation. They managed to reduce the rate from 7.5 to 1%.\(^5\)

Weiss and Jacobs later advocated repair of both the short external rotators and the posterior capsule.\(^5\) Headley and workers used a no.1 vicryl suture to repair the posterior soft tissue and reduce the incidence of dislocation to less than 1% in the first large study of 259 patients.\(^6\)

Pellicci et al report no incidence of posterior dislocation in 395 cases operated by the posterior approach when they used an enhanced posterior soft tissue repair.\(^7\)

He used drill holes in the greater trochanter and number 2 ethibond to suture the short external rotators to the greater trochanter, and also repaired the Quadratus femoris muscle belly, overlying fat and bursa.\(^8,9\) Various authors used different techniques to repair the posterior soft tissue and encountered a significant reduction in the dislocation rate.\(^9,14\)

Nissen et al reported that the lateral approach, though it gives excellent exposure disturbance of the abductor mechanism is common.\(^15\) Baker et al reviewed this particular side effect in patients who underwent total hip replacement and conclude that it is more common in the lateral approach than the modified lateral and posterior approaches.\(^16\)

Masonis et al in his review of comparison of direct lateral, posterior and transtrochanteric approaches suggested that though lateral approach has a much reduced incidence of dislocation, there is a slightly higher incidence of limping.\(^20\)

Morrey et al found a minimal increase in heterotopic bone formation in the lateral approach compared to a posterior approach, and this according to him was the reason for better pain relief and functional outcome in the posterior approach group.\(^17\)

The ideal cup positioning according to Lewinnek in his landmark paper is with 5-25° of anteversion and 30-50° of inclination. CT scan is the gold standard for evaluating cup version, whereas inclination can be studied with a plain X-ray taken with the joint centred and correction of pelvic tilts in the sagittal plane.\(^18,22\)

Aim of the study was to study the functional outcome of posterior and lateral approaches in hip arthroplasty and to compare the functional outcomes of the posterior and lateral approaches to the hip in arthroplasty and to analyse the effect of approach on the placement of acetabular cup with relation to its inclination and version in arthroplasty of the hip.

METHODS

In Kilpauk Medical College between August 2009 and April 2013 primary total hip replacement for 122 patients was done. Of which 86 patients (108 hips) were included in this study, who met the inclusion criteria and available for a minimum follow up of 3 years.

Out of 108 hips 52 were operated by posterior approach and the remaining 56 by lateral approach. Surgeries were done by four surgeons who had proper training and experience in arthroplasty. The choice of approach was determined by random numbers. It is a Randomized Prospective Comparative study of 108 hips.

**Inclusion criteria**

- Adult age group above 18 years.
- Chronic arthritis of the hip joint.
- Secondary arthritis of the hip joint.
- Uncemented THR

**Exclusion criteria**

- Age less than 18 years.
- Fracture of proximal femur.
- Infected hips.
- Revision arthroplasty.
- Cemented THR

All patients were operated with De Puy total hip replacement system, with metal on polyethylene articulation, coral stem, ultra high molecular weight poly-ethylene (UHMWPE) liner and a standard 28 mm metal (stainless steel) head. A standard preoperative protocol was followed with emphasis on the Harris Hip Score.

All the cases were done under regional anaesthesia, with patient in lateral position. In lateral approach we followed the steps described in standard Hardinge approach (Figure 1). And meticulous soft tissue repair was done at the end of the procedure.

In cases of posterior approach the principles of standard Moore’s approach was followed; and after the implantation of prosthesis and joint reduction enhanced soft tissue repair of posterior capsule, piriformis tendon, short external rotators and quadratus femoris (Figure 2). Any drains was not routinely don’t use.

Bilateral cases were operated with a mean interval of 7 days. Patients were started to mobilise the hip, knee and ankle from the first day. Patients were allowed to bear weight as tolerated from second day. Thromboembolic prophylaxes were given only to high risk cases. X rays were taken in the second postoperative day. Patients were followed up periodically at the end of 1 month, 3 months, 6 months, 12 months and then at yearly interval. At each
follow-up clinical assessment with Harris hip score and radiological assessment with anteroposterior and cross table lateral views were done. At the one month follow up CT scan was taken for the purpose of evaluating cup version.

RESULTS

Out of the 106 hips operated, avascular necrosis was the major indication for surgery in our study. The mean Harris hip score in the posterior group was 92.6 and in the lateral group it was 90.7. Even though the posterior group has a better post op functional score, the difference is not statistically significant. 3 cases of superficial infection in the posterior group and 1 deep infection and one superficial in the lateral group were observed. There was no case of dislocation in our study in either of the approaches. Even though there were 2 cases of acetabular cup retroversion, which is known to predispose to posterior dislocation, we did not have any in the posterior group even 1 year after surgery. We had a case of heterotopic ossification in our series in the posterior group. Abductor dysfunction was noted in 2 patients with lateral approach and in 2 patients with posterior approach.

The mean inclination and version of acetabular cup was measured in X ray and CT (Table 1). A surprising fact was that 2 of the cases in the posterior approach had retroverted cups on CT, which was not discerned on X rays. 3 out of the lateral approach group had inclination outside the safe zone as compared to 1 in the posterior approach group, whereas in version both the groups had 2 values outside the safe zone as per the CT measurements.

### Table 1: Mean acetabular inclination and version.

<table>
<thead>
<tr>
<th>Approach</th>
<th>Inclination in degrees</th>
<th>Version in degrees</th>
<th>Version in degrees by CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral</td>
<td>43.9</td>
<td>16.4</td>
<td>16.3</td>
</tr>
<tr>
<td>Posterior</td>
<td>45.3</td>
<td>13.2</td>
<td>9</td>
</tr>
</tbody>
</table>

DISCUSSION

The direct lateral and posterior approaches are fundamentally similar in that they are both muscle-splitting approaches to the hip. However the surgical anatomy and potential complications differ between these approaches, which can influence patient outcomes. The most important determinants of a successful THA are based on its goals of treatment: mitigation of pain, improved quality of life and restoration of function. Barber and colleagues prospectively followed for 2 years 28 patients undergoing direct posterior and 21 undergoing direct lateral THA, each performed by a single surgeon. Both groups had similar improvements on the Harris hip score at the 2-year follow-up and had no observable differences in dislocations or in the incidence of a Trendelenburg gait 24. In present study also we have not encountered any dislocation in either group.

A more recent prospective study randomly assigned 60 patients to undergo THA through either a posterior or lateral approach. Both approaches showed similar improvements across the Harris hip score, WOMAC and SF-36 questionnaires at multiple time points up to and including 12 weeks postoperatively. The rate of dislocation and fracture did not differ significantly between the groups. Harris hip score in our study also favors that there is no significant difference with either approach.
A common comparator between the posterior and lateral approach is the incidence of abductor insufficiency. Several studies have suggested the direct lateral approach has an increased incidence of abductor insufficiency following THA. The reported incidence varies from 0% to 16% for the posterior approach and from 4% to 20% for the direct lateral approach. The incidence of abductor insufficiency is equal with both approaches in present study.

Dislocation is one of the most common and devastating complications after THA. Acetabular positioning directly influences dislocation rates. It is, therefore, no surprise that majority of the literature attempting to discern an ideal orientation for the acetabular component is based on reducing dislocation rates. Although the recent use of larger femoral heads dramatically reduced dislocation rates, they are not considered a substitute for a proper cup positioning.

Lewinnek et al showed that cups with an anteverision of 15±10 degrees and inclination angle of 40±10 degrees had 1.5% dislocation rates, while acetabular components outside this safe zone had a dislocation rate of 6.1%. This historic paper, however, has been challenged in literature due to its methodology. Other authors have since attempted to re-define the optimal acetabular position based on biomechanical and clinical studies. As per those studies the ideal inclination was 35° to 45°±10° and the ideal anteverision was 15° to 30°±10°. This wide range indicates that the ideal acetabular position, still remains a topic of debate. Present mean acetabular inclination and anteverision fall within this safe zone.

CONCLUSION

To conclude, the approach did not significantly affect the outcome in total hip replacement with respect to functional outcome or rates of complication. And it neither influences the acetabular cup placement. Proper operative technique seems to be more important than the choice of approach in total hip replacement. Studies with a bigger sample size need to be done to further throw light on the role of approach on cup placement.

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